

Breakthrough could reduce production costs by 10-15%

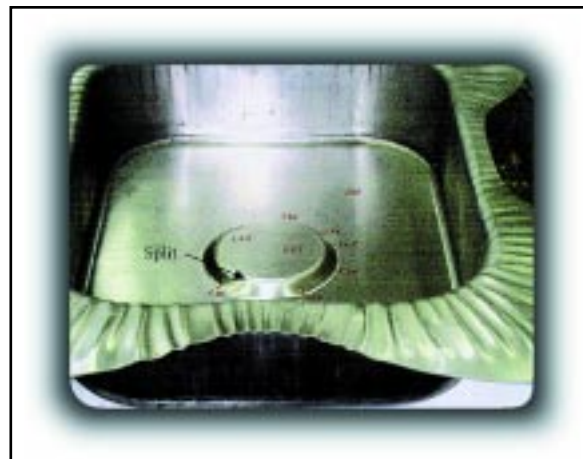


O A A T A C C O M P L I S H M E N T S

Continuous-Cast Aluminum Sheet

Challenge

The use of lightweight materials, such as aluminum, magnesium, titanium, and polymer matrix composites, as substitutes for steel in automotive applications can have a significant impact on increasing fuel efficiency. Unfortunately, all of these materials are more costly than the materials that they replace. The higher cost of using these materials precludes their widespread use. Therefore, it is necessary to develop technologies that reduce the cost of primary materials and/or improve their manufacturability.



Stamping made from continuous-cast 5754 aluminum sheet.

Technology Description

Since 1996, the U.S. Department of Energy has supported research to reduce the cost of aluminum for automobiles. In one project, researchers examined a continuous-casting process for automotive sheet that is used to make structural panels for cars. The current process involves casting alloyed aluminum into large (approximately 30,000-lb) ingots, which are homogenized in a furnace, hot-rolled, cold-rolled, and annealed many times to reach the desired final gage. In the new continuous-casting process, the alloyed aluminum is cast directly into a thin slab, hot-rolled in line, and annealed. Before this breakthrough, continuous-cast aluminum sheet typically did not have the combination of properties required for automotive applications.

Accomplishments

- Researchers developed a continuous-cast and hot-rolled 5754 aluminum alloy sheet that has properties as good or better than those of 5754 sheet produced by the ingot method.
- Estimates indicate that this breakthrough could reduce the cost of producing the sheet from the primary (raw molten metal) aluminum by 10-15%.

Benefits

- At current prices for primary aluminum, the cost of 5754 sheet could fall near or below the \$1/lb target that would make aluminum competitive with steel for more automotive applications
- Reducing the weight of automobiles results in lower petroleum consumption and fewer emissions.

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Future Activities

- Demonstrate the continuous-casting process for 6000-series alloys used in outer panels.
- Optimize the process so that the aluminum industry will invest in this technology and the automotive industry will increase the use of aluminum sheet components.

Partners in Success

- Commonwealth Industries
- Los Alamos National Laboratory
- Reynolds Metals Corporation

